

# Upper Midwest Environmental Sciences Center September 2011 Activity Report

## Aquatic Ecosystem Health

### Immediate-Release Sedatives

- UMESC scientists assisted Jim Bowker and Nicole Wandelaar from the U.S. Fish and Wildlife Service's Aquatic Animal Drug Approval Partnership (*located in Bozeman, MT*) in the completion of 14 sedative efficacy trials to evaluate the effectiveness of the "immediate-release" sedatives AQUI-S®20E and BENZOAK®. The sedatives were tested at UMESC September 20-23 on a variety of freshwater-reared finfish from UMESC's fish culture facility. Brown trout, lake trout, walleye, fathead minnows, yellow perch, and common carp were exposed to the sedatives at different concentrations and temperatures and assessed for time to sedation and time to recovery. Results from the trials will be used to complete the U.S. Food and Drug Administration's Center for Veterinary Medicine (CVM) effectiveness technical section data requirements, for the use of a new immediate-release sedative for all freshwater finfish.

### Presentations

- Mark Gaikowski provided an update on aquaculture drug development and registration progress at the [Veterinary Workshop on Fish Regulatory Medicine](#), September 19 in Madison, WI.

## Aquatic Invasive Species – Asian Carp

### Minnesota Water Week

- Mike Jawson and Mark Gaikowski participated on an Aquatic Invasive Species expert [panel discussion](#) on Asian carp and zebra mussel control research September 16, held in conjunction with [Minnesota Water Week](#) sponsored by [Minnesota Waters](#). Minnesota Waters is a 501.c.3 organization created to promote responsible stewardship of Minnesota's water resources by engaging citizens, local and state policymakers, and other partners in the protection and restoration of Minnesota's lakes and rivers.

### Non-Target Species of Concern

- Steve Redman acquired paddlefish from Gavins Point National Fish Hatchery, Yankton, S.D. These fish are critical to [research projects UMESC](#) is engaged in to develop Oral Delivery Formulations (ODF) of piscicides for controlling Asian carps. Specifically, these fish will be used in trials to determine the effects of ODF piscicides on native, non-target fish.

## Aquatic Invasive Species – Sea Lamprey

### Enhanced Treatment Regimes

- Mike Boogaard, Terrance Hubert, Jeff Bernardy, and Jane Rivera submitted a project completion report to the Great Lakes Fishery Commission, on using enhanced treatment regimes to control sea lampreys in the Great Lakes. The team evaluated stream concentrations of the lampricide 3-trifluoromethyl-4-nitrophenol (TFM) during six sea lamprey control treatments, to evaluate the use of enhanced treatment strategies with respect to the within stream distribution of the lethal dose of TFM. The enhanced concentration treatment strategy achieved average TFM concentrations of sufficient magnitude and duration for effective control.
  - Boogaard, M.A., T.D. Hubert, J.A. Bernardy, and J.E. Rivera. 2011. [Evaluation of within stream lampricide distribution as a measure of treatment effectiveness in controlling larval sea lampreys using enhanced treatment regimes in Great Lakes tributaries](#). Completion report submitted to the Great Lakes Fishery Commission. 33 pp.

## Non-Target Species of Concern

- Mike Boogaard, Terry Hubert, and Nick Schloesser participated in a collaborative field study to evaluate the risk of lampricide exposure to juvenile lake sturgeon during the sea lamprey control treatment of Lake Huron's Pigeon River, August 30-September 8. The study involved placing a series of cages containing juvenile lake sturgeon in the treated areas of the Pigeon River to estimate the impact of the lampricides TFM and Bayluscide on this non-target species of concern. This study is part of the UMESC's long term commitment to provide technical assistance to the Great Lakes Fishery Commission's Sea Lamprey Control Program. Offices participating in the chemical treatment of the Pigeon River were the U.S. Fish and Wildlife Service's Marquette Biological Station, the Ludington Biological Station, and Fisheries and Oceans Canada's Sea Lamprey Control Centre.

## Regulatory Actions

- UMESC submitted the following regulatory actions during September 2011, for [chemical](#) and [biochemical tools](#) used by the Great Lakes Fishery Commission Integrated Management of Sea Lamprey (*Petromyzon marinus*) Control Program.
  - Rivera, J.E. and T.D. Hubert. 2011. Application to extend the Sea Lamprey Migratory Pheromone permit 75437-EUP-1, under Category No. B621 of the Pesticide Registration Improvement Renewal Act of 2007. Submitted to the U.S. Environmental Protection Agency, September 14, 2011.
  - Rivera, J.E. and T.D. Hubert. 2011. Application to extend the Male Sea Lamprey Sex Pheromone permit 75437-EUP-2, under Category No. B621 of the Pesticide Registration Improvement Renewal Act of 2007. Submitted to the U.S. Environmental Protection Agency, September 14, 2011.
  - Rivera, J.E. and T.D. Hubert. 2011. Application to extend the Male Sea Lamprey Mating Pheromone permit 75437-EUP-3, under Category No. B621 of the Pesticide Registration Improvement Renewal Act of 2007. Submitted to the U.S. Environmental Protection Agency, September 14, 2011.
  - Rivera, J.E. and T.D. Hubert. 2011. Michigan Department of Agriculture and Rural Development Non-Specialty Sales-Based Fee Listing Report regarding the use of TFM and niclosamide formulations in sea lamprey control operations in Michigan. Submitted to the Michigan Department of Agriculture, September 15, 2011.
  - Rivera, J.E. and T.D. Hubert. 2011. Research Authorization application for the Male Sea Lamprey Mating Pheromone under the Pest Control Products Act. Submitted to the Health Canada Pest Management Regulatory Agency, September 21, 2011.

## Association of Fish and Wildlife Agencies

### 101<sup>st</sup> Annual Meeting

- Jack Waide and Mark Gaikowski attended the [101st Annual Meeting](#) of the Association of Fish and Wildlife Agencies, September 11-14 in Omaha, NE. Gaikowski gave the presentation, "Potential Targeted Delivery of Biocides for Species-Specific Control of Aquatic Invasive Species and An Update on Studies with Pf-CL145A (Zequanox®)," and participated in the Drug Approval Working Group's progress and planning meeting for the development of aquaculture drugs. Waide attended several committee meetings.

## Climate Change

### Lake Habitat

- Kevin Kenow met with Wisconsin Department of Natural Resources staff to finalize common loon habitat models for use in evaluating changes in lake habitat suitability for loons resulting from climate change, September 20 in Madison, WI.

## Wisconsin Climate Change Initiative

- Kevin Kenow participated in a meeting of progress made on wildlife vulnerability assessments, the development of an evaluation project, an adaptation plan, and outreach, for the [Wisconsin Climate Change Initiative's Wildlife Working Group](#), September 20 in Madison, WI.

## Environmental Contaminants

### Using Swallows as Sentinel Species

- Christine Custer authored an invited book chapter that summarizes current literature on the use of swallows as a model species for contaminant exposure and effect studies, and provided three case studies illustrating their use in both natural resource damage and ecological risk assessments. The chapter is designed for use by new swallow biologists who need to quickly learn the state of the science, and for others needing a quick reference guide to studies using this species.
  - Christine Custer. [Swallows as a Sentinel Species for Contaminant Exposure and Effects Studies](#). In: Elliott, J.E., C.A. Bishop, C.A. Morrissey. 2011. [Wildlife Ecotoxicology: Forensic Approaches](#). Vol. 3. Springer. DOI:10.1007/978-0-387-89432-4

## Geospatial Science & Technology

### Decision Support Tools

- Jason Rohweder and Tim Fox gave a presentation on [decision support tools](#) developed by UMESC that could also be used to support U.S. Fish and Wildlife Service (FWS) monitoring programs, September 1. The presentation featured the application Field Notes, available technologies, and how the UMESC developed tools could be applied. FWS personnel who participated in the call included zone biologists Sean Blomquist and Brian Loges, hydrologists Brian Newman and Josh Eash, and wildlife biologist Jessica Dowler.

## Great Lakes Restoration Initiative (GLRI)

### Project #80, Birds as Indicators of Contaminant Exposure

- UMESC scientists will give the following presentations at the [State of Lake Michigan and Great Lakes Beach Association Conference](#), September 28, in Michigan City, IN.
  - “Tree swallows: a tool to assess Beneficial Use Impairments (BUIs) in Great Lakes Areas of Concern,” (poster) by Christine Custer, Thomas Custer, and Paul Dummer. The poster highlights the ways that Great Lakes Restoration Initiative Project 80, Birds as Indicators of Contaminant Exposure and Effects, can be used by State regulators and the U.S. Environmental Protection Agency to address two of the wildlife-related BUIs.
  - “Birds as indicators of environmental contamination in Lake Michigan,” by Thomas Custer, Christine Custer, Paul Dummer, J.C. Franson, and N.K. Karouna-Reiner.
- Tom and Chris Custer visited the St. Clair River Area of Concern (AOC), Clinton River AOC, and Kalamazoo River AOC, September 22-26, to obtain or request permission from land owners to set up nest box sites for the 2012 field season. The nest boxes will be used to collect data for Great Lakes Restoration Initiative project #80, [Birds as Indicators of Contaminant Exposure in the Great Lakes](#).

### Project #73, Avian Botulism in Distressed Great Lakes Environments

- Steve Houdek, Kevin Kenow (UMESC), Brian Lubinski (FWS) began a series of aerial waterbird surveys on Lake Michigan in association with the USGS Wind Energy and Great Lakes Restoration Initiative botulism projects, September 12-16. Impact assessment of near-shore and off-shore wind turbine placement, characterization of sea duck wintering distribution and population status, and elucidating factors that influence the outbreak of type-E avian botulism

all require better [understanding of the distribution, abundance, and temporal use patterns of waterbirds](#). The surveys are expected to continue monthly through next spring.

- Kevin Kenow was interviewed by Carol Thompson (*Great Lakes Echo*) in regards to Kenow's projects for [tracking the migration and feeding habits of common loons](#), for a project studying outbreaks of type-e botulism in the Great Lakes. The article, [published on-line September 22](#), discusses what type-e botulism is, its history in the Great Lakes, and current research projects.

## Long Term Resource Monitoring Program

### 25<sup>th</sup> Anniversary Celebration

- Mike Jawson and Barry Johnson will participate in a celebration for the 25th anniversary of the Upper Mississippi River Restoration's Environmental Management Program (EMP), September 28-29 in Dubuque, IA. The EMP has successfully monitored the ecological health and restored 100,000-acres of habitat on the Upper Mississippi River System (UMRS). Celebration activities will include a dinner on the 28th followed by a commemoration ceremony and field trip on the 29th. Assistant Secretary of the Army for Public Works, Jo Ellen Darcy, will attend the event. The EMP is a cooperative research and monitoring program for the Upper Mississippi River System, funded by the U.S. Army Corps of Engineers (USACE) and implemented by USGS-UMESC, in collaboration with the U.S. Fish and Wildlife Service (FWS), EPA, and the states of Illinois, Iowa, Minnesota, Missouri, and Wisconsin.

### Land Cover Mapping

- Larry Robinson (*UMESC*) and Brian Lubinski (*FWS*) completed the collection of late-summer 16-inch per pixel aerial photography for the Upper Mississippi River. This effort is a continuation of the systemic imagery acquisition for the UMRS that started last summer but was halted due to high water. The photos are being used to develop a [2010/2011 systemic vegetation inventory](#) for the Upper Mississippi River, from Minneapolis, MN to Cairo, IL and the full length of the Illinois River. Similar, systemic inventories were conducted in 1998 and 2000.
- Jenny Hanson and Erin Hoy conducted field reconnaissance of the digital 8- and 16-inch/pixel color-infrared aerial photography for several Mississippi River navigation pools, for the Long Term Resource Monitoring Program's [2010/11 Land Cover/Land Use mapping project](#). Hanson and Hoy compared ground vegetation to the aerial photography, and collected data points to develop mapping models.

## Mississippi River

### Aquatic Vegetation Sampling Techniques

- Brian Gray (*UMESC*), Ryan Nielson, Lyman McDonald (*Western Ecosystems Technology*), and Patricia Heglund (*FWS*) published a manuscript on the use of [rake sampling](#) to sample Submersed Aquatic Vegetation (SAV), versus alternative sampling methods (*e.g.*, *snorkeling*) which can be more expensive, and hazardous, to perform. Unfortunately, the prevailing method of estimating the probability of site occupancy from rake data leads to an estimator of occupancy probability that is biased low, with bias expected to increase in magnitude as SAV biomass and SAV coverage within sampling sites decrease. This study evaluated the use of the site occupancy model used in wildlife ecology to estimate occurrence probabilities that have been adjusted for detection errors, and did so for two species common to the Upper Mississippi River, Canadian waterweed and wild celery. Point estimates of site occupancy increased by 36% and 19%, respectively, when adjusted for detection errors and incomplete within-site coverages. The method requires further evaluation for settings where the number of rake detections are small and detection probabilities and/or within-site coverages vary substantially among sites.

- Nielson, R.M., B.R. Gray, L.L. McDonald, P.J. Heglund. 2011. [Estimating site occupancy rates for aquatic plants using spatial sub-sampling designs when detection probabilities are less than one](#). *Aquatic Botany*. 95:221-225.

## National Parks

### **Arcadia National Park (ACAD, Habitat Fragmentation)**

- Jason Rohweder, Nathan De Jager (*UMESC*), and Glenn Guntenspergen (*PWRC*) presented the draft results from an analysis to examine the effects of development adjacent to Acadia National Park, on habitat fragmentation and the suitability of habitat for bobcat, fisher, mink, and moose in the Park and other nearby protected areas, September 27 in Acadia National Park, ME.

### **Appalachian National Scenic Trail (APPA, Vegetation Mapping)**

- Kevin Hop, Andrew Strassman (*UMESC*), Tony Davis (*PA Natural Heritage*), James Vanderhorst (*WV Division of Natural Resources*), and Gary Fleming (*VA Department of Conservation and Recreation*) conducted the third of three field reconnaissance trips to the Central Appalachian Ecoregion (CAE) of the Appalachian National Scenic Trail (APPA), to support the development of the map classification and conventions for the mapping of the CAE for the National Park Service Vegetation Inventory Program, September 25-October 8. The CAE will be mapped this fall and winter.

### **Cuyahoga Valley National Park (CUVA, Vegetation Mapping)**

- Erin Hoy and Andrew Strassman conducted field work to tie together aerial imagery collected by *UMESC* staff with ground vegetation classified to the National Vegetation Classification Standard 2.0 (NVCS 2), to produce a complete NVCS 2 - compatible map for the Cuyahoga Valley National Park Vegetation Mapping Project, September 8-14. They were assisted in the field by Jim Drake (*NatureServe*), Kevin Skerl, and Chris Davis (*NPS*).

### **Voyageurs National Park (VOYA, Water-Level Regulation)**

- Steve Gutreuter (*UMESC*) and Ryan Maki (*NPS*) are collaborating on a synthesis of research of effects of water-level regulation on the biota of Voyageurs National Park (VOYA), and in the development and testing of statistical models to identify and predict effects of water-level fluctuations on loon nesting success, reproductive success of selected fishes, and body burdens of mercury in yellow perch for the large lakes of VOYA. Other stakeholders include the International Joint Commission, which is funding the development of loon models, the Minnesota Department of Natural Resources, and the Ontario Ministry of Natural Resources.

## Other

### **EPA**

- Personnel from the U.S. Environmental Protection Agency (EPA) laboratory in Duluth, MN travelled to *UMESC* to acquire 200 adult rainbow trout that had been reared at *UMESC*. The EPA laboratory will use the fish in multiple research projects throughout the remaining year. This was the first of 2 acquisitions that will occur this year. *UMESC* has been providing the EPA laboratory with fish for research purposes for more than 5 years.

### **National Boating Access Conference**

- Randy Hines, Mark Gaikowski and Jennifer Dieck hosted a field-trip tour for about 100 participants of the 25th Anniversary National Boating Access Conference sponsored by States Organizations for Boating Access (SOBA) September 29 in La Crosse, WI. USGS science on aquatic ecosystems, aquatic invasive species and GIS demonstrations were provided, for state boating officials, consultants, engineering firms, manufacturers, suppliers, publishers, and

other businesspersons interested in boating access. UMESC has also been invited to participate in a special session for the development of an invasive species steering committee for SOBA. The SOBA organization provides a medium for the exchange of views and experiences that will foster private, interstate, and federal-state cooperation and coordination in boating facility acquisition, design, construction, and administration, and the conference provides a problem solving forum for the exchange of information and ideas relating to all aspects of recreational boating facilities.

### **Training**

- Jenny Hanson attended the 2011 GeoCue Training Event focusing on tools and techniques available within the LP360 software for use with LIDAR data, September 19-23 in Nashville, TN. The event hosts 4 tracks of study covering basic to advanced topics in GeoCue, Terrasolid, and QCoherent products. The training will be applied to troubleshoot complex data sets or challenging problems with LIDAR that has been acquired for the Upper Mississippi River System.
- John (JC) Nelson attended the Data Management training at USGS Headquarters in Reston, VA. Nelson was nominated to represent the Midwest Area as a science data coordinator. This workshop will help him fulfill this duty.
- Lisa Hein attended National Archives and Records Administration training to become a Certified Records Manager, September 12-24, Fort Worth, TX.

September 12-24.

### **Wisconsin Geographic Information Coordination Council**

- John (JC) Nelson was re-elected as the Wisconsin Geographic Information Coordination Council's Federal Sector Representative. Nelson was originally elected to replace Dick Vraga, USGS. Having Nelson on the board gives UMESC a presence within Wisconsin's geographic information community and builds relationships throughout the state.

### **Acronyms**

ACAD – Acadia National Park  
AOC – Area of Concern  
APPA - Appalachian National Scenic Trail  
BUI – Beneficial Use Impairments  
CAE – Central Appalachian Ecoregion  
CVM – Center for Veterinary Medicine  
EPA – U.S. Environmental Protection Agency  
EMP – Environmental Management Program  
FWS – U.S. Fish and Wildlife Service  
LTRMP – Long Term Resource Monitoring Program  
NPS – National Park Service  
NVCS – National Vegetation Classification Standard  
ODF – Oral Delivery Formulations  
PWRC – Patuxent Wildlife Research Center  
SAV – Submersed Aquatic Vegetation  
SOBA – State Organizations for Boating Access  
TFM – 3-trifluoromethyl-4-nitrophenol (a lampricide)  
UMESC – Upper Midwest Environmental Sciences Center  
UMRS – Upper Mississippi River System

USACE – U.S. Army Corps of Engineers  
USGS – U.S. Geological Survey